DOCUMENT RESUME

ED 305 377 TM 012 895

AUTHOR McCoy, Leah P.; Haggard, Cynthia S.
TITLE Determinants of Computer Use by Teachers.
PUB DATE Feb 89
NOTE 18p.; Paper presented at the Annual Meeting of the Eastern Educational Research Association (Savannah, GA, February 1989).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; Computer Uses in Education; *Elementary School Teachers; Elementary Secondary Education; *Microcomputers; *Predictor Variables; *Secondary School Teachers; Self Esteem; Sex Differences; Teacher Attitudes; Teaching Experience
IDENTIFIERS Teacher Surveys

ABSTRACT

A survey of 112 teachers working in 26 schools in six districts within a regional area was conducted to investigate microcomputer use by teachers. The survey instrument included items on personal characteristics, years of teaching experience, current use of computers in the classroom, confidence in personal ability to use computers, and perception of the value of computers in education. A total of 81 teachers responded. Results indicate that: (1) 25% of the respondents reported little or no use of computers; (2) 75% of the respondents reported intensive, regular, or occasional use of computers; (3) computer-assisted instruction, word processing, graphics, and record keeping were the most typical applications of computers; (4) teaching experience correlated positively with computer use; (5) elementary school teachers were more likely to use computers than were secondary school teachers; and (6) gender, confidence in ability, and perceived value of computers in education had no effect on whether or not teachers used computers in instruction. Seven data tables are included. (TJH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED305377

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

LEAH P. McCOY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Determinants of Computer Use by Teachers

Leah P. McCoy

Cynthia S. Haggard

Indiana University at South Bend

RUNNING HEAD: Computer Use

Paper prepared for presentation at the 1989 Eastern Educational Research Association Annual Meeting, Savannah, GA, February, 1989

TM012895

Determinants of Computer Use by Teachers

Bruder (1988) reported that there are nearly 1.5 million computers in American schools today. However, there is wide variation in both the amount and type of use of computers by teachers.

A number of studies have highlighted teacher reluctance in incorporating technology (Caissy, 1986; Jorde, 1987; McMeen, 1986). However, empirical studies reporting actual use are rare. A recent survey (Becker, 1986) found that a typical school has 4 to 5 teachers who use computers regularly. When one considers that most schools have at least 20 to 50 teachers, this is a very small percentage. The most recent NAEP Survey of 24,000 students nationwide found that 10 percent or fewer used a computer in school more than once a week (LaPointe & Martinez, 1988).

Of those teachers using computers, there is also variation in the way they use them. An early conceptual organization of computer use in education was presented by Taylor (1980). He suggested that a computer in the classroom may be used as a tutor, a tool, or a tutee. The tutor mode refers to use of the computer as an instructional aid, commonly referred to as computer-assisted-instruction. The tool mode refers to use of the computer as a production or management tool, such as word processing, graphics, test generation, or record keeping. The tutee mode refers to the situation where the child teaches the

computer by programming.

Naron and Estes (1986) surveyed 16 public schools and concluded that elementary teachers tend to use computers in a supplementary way or as another teaching tool. In secondary schools, they found that computer courses had been added as electives, but other courses were largely unchanged. The NAEP data indicated that 70 percent of eleventh grade students had never used a computer in mathematics class, 83 percent had not used a computer in English class, and even fewer had used a computer in other classes (LaPointe & Martinez, 1988). Lamon and Bright (1987) found that computers in classrooms were used by students for individual diagnosis and drill and practice, and also by teachers for test preparation and record keeping. Becker (1988) found that word processing was the most popular form of computer use in schools.

There is little evidence as to what factors influence teachers' decisions about computer use in the classroom. Trollip and Alessi (1988) suggest that the major reason that teachers do not use computers is that they are not comfortable with the computers themselves because of inadequate training. Cicchelli and Baecher (1985) found that neither grade level taught (elementary, junior high, or high school) nor gender had an effect on teachers' computer use.

Thus, while we have some information about teacher use of computers, there are still several unanswered questions. This study sought to answer the following questions for teachers in

one geographic area. (1) How many teachers are using computers in the classroom? (2) How are they using computers? (3) What factors affect their use of computers?

Methods

The participants in this study were teachers in twenty-six schools in six school districts in a regional area. All schools have microcomputers available to teachers. Surveys were distributed to 112 teachers, and the 81 returning the survey became the sample. The return rate was approximately 72 per cent.

The survey consisted of items of personal characteristics: gender, level taught, and years of teaching experience. It also contained three measures of computer-related variables: current use of computers in the classroom (total of ten uses, each on a scale of 0, no use, to 3, intensive use), confidence in personal ability to use computers (yes or no), and perception of the value of computers in education.

Results

Means and standard deviations of the total computer use score (sum of reported use in the ten areas), years of teaching experience and perceived value of computers in education are given in Table 1. Distribution of nominal variables (computer confidence, gender, and level taught) are given in Table 2.

The computer use data was further summarized by classifying

computer use as low, occasional, regular, or intensive (See Table 3). Results indicated that only 7 percent of teachers' use of computers was intensive, while 32 percent used the computer regularly, 36 percent used it occasionally, and 25 percent reported little or no use of computers.

Numbers and percents of teachers reporting regular or intensive use of the computer in the ten areas of the computer use scale are given in Table 4. This data was further analyzed by grouping the ten items into the categories suggested by Taylor (1980), with the addition of a mode called general introduction to the computer. This data (see Table 5) indicated that more teachers used the computer in the tutor mode (47 percent). The tool mode use was 40 percent, the general introduction mode was 38 percent, and the tutee mode was only 7 percent.

The correlation matrix of the relationships of all variables is presented as Table 6. To examine the determinants of computer use, total current use of computers was regressed on the other five variables: gender, level taught, years of teaching experience, confidence in personal ability to use computers, and perception of the value of computers in education. The results of the multiple regression indicated that years of teaching experience and level of teaching (elementary vs. secondary) were significant in predicting amount of computer use in teaching (See Table 7). Both of these variables produced significant positive beta weights, indicating that computers are used more by more experienced teachers and by elementary teachers.

These results indicate that the other variables were not important in determining computer use of teachers. That is, gender, confidence in personal computer ability, and perceived value of computers in education had no effect on whether or not teachers used computers in teaching. The adjusted R-Squared for the multiple regression was .201, indicating that these variables accounted for 20 percent of the variation in total amount of computer use.

Conclusions

In answer to the first question, "How many teachers are using computers?", the results of this study indicated that 25 percent of the teachers in the sample reported that they used the computer very little. The other 75 percent reported intensive, regular, or occasional use. Therefore, three quarters of the teachers in this sample did use the computer. This is a higher rate than that reported in the NAEP survey (LaPointe & Martinez, 1988).

In answer to HOW the teachers are using the computer, the results show that this sample of teachers use the computer mostly in a tutor or tool mode. That is, they used the computer for individualized computer-assisted-instruction and for word processing, graphics production, and record keeping. Few of the teachers in the sample used the computer in a tutee mode (programming). A number of the teachers used the computer in a general introduction to computers mode. It is likely that this

number will decrease as students become more computer literate in general. The teachers in this sample used the computer for computer-assisted-instruction and for tool applications. Fewer teachers utilized the tutee mode, teaching programming in specialized courses.

Contrary to our expectations, the results of this study indicated that computers were used more by more experienced teachers. This might be a reflection of the fact that experienced teachers typically use a larger variety of teaching activities, and that the computer is more easily added to their "repertoire." Even though less experienced teachers have likely received more computer education training, they report less use of computers in teaching.

Teaching level was a significant determiner of computer use, with the elementary teachers being more likely to use computers. This is probably due to the elementary teachers' perceived responsibility for the students' "whole" education, into which they include computers. The high school teachers are more likely to have a narrow view of their responsibility, including only their particular content area. Thus, the high school teachers see computer education as the domain of the computer teacher or some other subject area.

Similar to several other studies of the relationship of gender and computers, this study found no differences in computer use by male and female teachers. Neither teachers' confidence in their own computer ability nor their perception of the value of

computers in education influenced their computer use.

Therefore, this study found that in one regional area, 75 percent of the elementary and secondary teachers were using computers. They were using them mainly for computer-assisted-instruction and for tool applications such as word processing and graphics production. Those factors which were predictive of computer use were level of teaching assignment and years of teaching experience, with elementary teachers and more experienced teachers being likely to use a computer more.

Even though this study involved a relatively small sample in one region, these figures may be representative of larger groups of teachers. Further study is suggested to verify national trends.

References

Becker, H. J. (1986). Our national report card: Preliminary results from the new Johns Hopkins survey. Classroom Computer Learning, 6 (4), 30-33.

Becker, H. J. (1988). The impact of computer use on children's learning: What research has shown and what it has not. Baltimore, MD: Johns Hopkins University, Center for Research on Elementary and Middle Schools.

Bruder, I. (1988). Electronic Learning's eighth annual survey of the states, 1988. Electronic Learning, 8 (2), 38-45.

Caissy, G. (1986, January) Using computers across the curriculum. FWTAQ Newsletter, pp. 50-53.

Cicchelli, T. & Baecher, R. (1985). Introducing microcomputers into the classroom: A study of teachers' concerns. Journal of Educational Computing Research, 1 (1), 55-65.

Jorde, P. (1987, February). Microcomputers and the pro-innovation bias. The Educational Digest, pp. 36-39.

Lamon, W. E. & Bright, G. W. (1987). Computers as direct aids to students and to teachers. Focus on Learning Problems in Mathematics, 9 (2), 1-3.

LaPointe, A. E. & Martinez, M. E. (1988). Aims, equity, and access in computer education. Kappan, 70 (1), 59-61.

McMeen, G. R. (1986, February). The impact of technological change on education. Educational Technology, pp. 42-45.

Naron, N. K. & Estes, N. (1986). Technology in the schools: Trends and policies. AEDS Journal, 19 (4), 31-43.

Taylor, R. P. (1980). The computer in the school: Tutor, tool, tutee. New York: Teachers College Press.

Trollip, S. R. & Alessi, S. M. (1988). Incorporating computers effectively into classrooms. Journal of Research on Computing in Education, 21 (1), 70-81.

Table 1

Means and Standard Deviations of Computer Variables

Variable	Mean	SD	Range
Computer Use	12.04	8.66	0 - 30
Teaching Experience	5.88	9.15	0 - 30
Value of Computers	31.17	10.07	0 - 58

n = 81

Table 2

Distribution of Computer Variables

Variable	Categories	Percents
Computer Confidence	Yes	70
	No	30
Gender	Female	85
	Male	15
Level Taught	Elementary	70
	Secondary	30

n = 81

Table 3

Total Teacher Use of Computers

Total Score on Current Use of Computers Scale	n	Percent
0 - 9 (Low)	20	25
10 - 19 (Occasional)	29	36
20 - 25 (Regular)	26	32
26 - 30 (Intensive)	6	7

n = 81

Table 4

Specific Teacher Use of Computers

Item	n	Percent
1. General Introduction to Computer	31	38
2. Instructional Drill	28	35
3. Individual Tutoring	20	25
4. Simulations	9	11
5. Programming Instruction	6	7
6. Recreational Games	18	22
7. Word Processing	16	20
8. Test, Worksheet Creation	17	21
9. Record Keeping	11	14
10. Graphics Creation	10	12

n = 81

Table 5

Teacher Use of Modes of Computing

Mode	n	Percent
General Introduction (Item 1)	31	38
Tutor (Items 2,3,4, or 6)	38	47
Tool (Items 7,8,9, or 10)	32	40
Tutee (Item 5)	6	7

n = 81

Table 6

Correlations of All Variables

	Exper.	Conf.	Gender	Level	Value	Use
Experience	----	-.10	.30	-.08	.16	.24
Confidence	-.10	----	-.11	.23	.27	.23
Gender	.30	-.11	----	-.41	-.26	.03
Level	-.08	.23	-.41	----	.39	.35
Value	-.16	.27	-.26	.39	----	.22
Use	.24	.23	.03	.35	.22	----

n = 81

Table 7

Summary of Regression Results for Computer Use by Teachers

	INDEPENDENT VARIABLES			
Teaching Experience	Teaching Level	Gender	Computer Confidence	Value of Computers
Standardized Coefficients:				
.262	.343	.141	.162	.121
Regression Coefficients:				
.247*	6.463*	3.401	3.054	.104
(.099)	(2.215)	(2.789)	(1.981)	(.097)

Constant	Adjusted R^2
.150	.201*

Standard Errors shown in parentheses

n = 81

* p < .05